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## APPENDIX 1

### Acronyms, Abbreviations, and Glossary

AA	Associate Administrator
AAA	Active Acquisition Aid
AAP	Apollo Applications Program
ACS	attitude control system
ACN	Ascension
ACU	antenna control unit
AES	Apollo Extension System
AFSC	Air Force Systems Command
AFSCN	Air Force Satellite Control Network
AGO	Santiago
AIS	Apollo Instrumentation Ship
ALT	Approach and Landing Test
CDR	Critical Design Review
CDSCC	Canberra Deep Space Communication Complex
CSIR	Council for Scientific and Industrial Research
CSIRO	Commonwealth Scientific and Industrial Research Organization
CSM	Command and Service Module
CSOC	Consolidated Space Operations Contract
DAF	Data Acquisition Facility
dB	decibels
DDMS	Department of Defense Manager for Manned Spaceflight

DF	direction finding
DJS	Dzhusaly, Razakhgtan
DLR	Germany's Deutsches Zentrum für Luftund Raumfahrt
DOD	Department of Defense
DOI	Department of the Interior
DOS	Department of Supply
DRSS	Data Relay Satellite System
DSN	Deep Space Network
DSS	Deep Space Station
EGO	Eccentric Geophysical Observatory
EGR	Eglin Gulf Test Range
ELVIS	Enhanced Launch Vehicle Imaging System
ERS	Earth Resource Satellite
ERTS	Earth Resource Technology Satellite
ESA	European Space Agency
ESD	Air Force Electronic Systems Division
ESMC	Air Force Eastern Space and Missile Center
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
ETR	Eastern Test Range
EVA	extravehicular activity
EUT	Eupatona, Ukraine
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDR	Final Design Review
FM	frequency modulation
FY	fiscal year
Gbps	gigabits per second
GDSCC	Goldstone Deep Space Communication Complex
GHz	gigahertz
GLTN	Goddard Laser Tracking Network
GMT	Greenwich Meridian Time
GN	Ground Network
GOES	Geostationary Observational Environmental Satellite
GRARR	Goddard Range And Range Rate
GRGT	Guam Remote Ground Terminal
GRO	Gamma Ray Observatory
GRTS	GRO Remote Terminal System
GSFC	Goddard Space Flight Center
GWM	Guam
HAW	Hawaii
HDTV	high definition television
HEAO	High Energy Astronomy Observer

HST	Hubble Space Telescope
HTV	H-II Transfer Vehicle
IAGS	Inter-American Geodetic Survey
IBM	International Business Machines
IBEW	International Brotherhood of Electrical Workers
ICBM	intercontinental ballistic missile
IDEA	International Space Station Downlink Enhancement Architecture
IGY	International Geophysical Year
IMP	Interplanetary Monitoring Platform
INEN	Integrated Near-Earth Network
INTA	Spanish National Institute of Aerospace Technology
INTELSAT	International Telecommunications Satellite Consortium
IOAG	Interagency Operations Advisory Group
IPF	Image Processing Facility
ISIS	International Satellite for Ionospheric Studies
ISO	Infrared Space Observatory
ISS	International Space Station
IUE	International Ultraviolet Explorer
IUS	Inertial Upper Stage
JAXA	Japan Aerospace Exploration Agency
JDMTA	Jonathan Dickinson Missile Tracking Annex
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
JWST	James Webb Space Telescope
KHz	kilohertz
KLP	Kolpashevo, Russia
Kpbs	kilobits per second
KPGO	Kokee Park Geophysical Observatory
KSAT	Kongsberg Satellite Services
KSC	Kennedy Space Center
LAGEOS	Laser Geodynamics Satellite
laser	light amplification by stimulated emission of radiation
LM	Lunar Module
LRC	Langley Research Center
LRO	Lunar Reconnaissance Orbiter
LRV	Lunar Roving Vehicle
M&DO	Mission and Data Operations
MA	Mercury-Atlas
MA	Multiple Access
MAD	Madrid
maser	microwave amplification by stimulated emission of radiation
Mbps	megabits per second
MCC	Mission Control Center

MDSCC	Madrid Deep Space Communication Complex
MESA	Modular Equipment Stowage Assembly
MFS	Manned Flight Support
MGS	McMurdo Ground Station
MHz	megahertz
MILA	Merritt Island Launch Annex
MIT	Massachusetts Institute of Technology
MOBLAS	Mobile Laser Ranging System
MOCR	Mission Operations Control Room
MOTS	Minitrack Optical Tracking System
MRCS	Mobile Range Control System
MSC	Manned Spacecraft Center
MSFN	Manned Space Flight Network
NACA	National Advisory Committee for Aeronautics
NAR	Non-Advocate Review
NAS	National Academy of Science
NASA	National Aeronautics and Space Administration
NASCOM	NASA Communications Network
NASDA	National Space Development Agency of Japan
NC	Network Controller
ND	Networks Directorate
NEN	Near-Earth Network
NFL	Newfoundland
NISN	NASA Integrated Services Network
NOAA	National Oceanic and Atmospheric Administration
NOCC	Network Operations Control Center
NORAD	North American Aerospace Defense Command
NRD	Air Force National Range Division
NRL	Naval Research Laboratory
NSC	Norwegian Space Center
NSF	National Science Foundation
NTSC	National Television System Committee
NTTF	Network Test and Training Facility
OAO	Orbiting Astronomical Observatory
OCC	Operations Control Center
OGO	Orbiting Geophysical Observatory
OMS	Orbital Maneuvering System
ORR	Orroral
OSC	Office of Space Communications
OSO	Office of Space Operations
OSO	Orbiting Solar Observatory
OSTDA	Office of Space Tracking and Data Acquisition
OTDA	Office of Tracking and Data Acquisition

PAL	Phase Alternating Line
PAM	Pulse Amplitude Modulation
PCM	Pulse Code Modulation
PCR	Payload Changeout Room
PCS	Pacific Command Ship
PCU	Power Control Unit
PDL	Ponce de Leon Station
PDR	Preliminary Design Review
PER	Pre-Environmental Review
PLSS	Portable Life Support System
PMR	Pacific Missile Range
PMRF	Pacific Missile Range Facility
POCC	Project Operations Control Center
POGO	Polar Orbiting Geophysical Observatory
PPK	Petropavlovsk-Kamchatskaya, Russia
PSAC	President's Science Advisory Committee
QUI	Quito
RCA	Radio Corporation of America
RCS	Reaction Control System
RF	radio frequency
RFP	Request For Proposal
ROS	Rosman
RTG	Radioisotope Thermoelectric Generator
RTHU	roll to heads-up
RTLS	Return to Launch Site abort
SA	Single Access
SAO	Smithsonian Astrophysical Observatory
SATAN	Satellite Automatic Tracking Antenna
SCAMA	Switching, Conferencing And Monitoring Arrangement
SCAMP	Satellite Command Antenna on Medium Pedestal
SDK	Ussuriysk, Russia
SDO	Solar Dynamics Observatory
SEB	Source Evaluation Board
SECAM	Sequential Color with Memory
SECO	sustainer engine cutoff
SGL	Space to Ground Link
SGLT	Space to Ground Link Terminal
SGS	SvalSat Ground Station
SIRTF	Space Infrared Telescope Facility
SITE	Satellite Instructional Television Experiment
SN	Space Network
SNIP	Space Networks Interoperability Panel
SOMO	Space Operations Management Office

SRB	Solid Rocket Booster
STADAN	Satellite Tracking And Data Acquisition Network
STADIR	Station Director
STDN	Spaceflight Tracking and Data Network
STG	Space Task Group
STGT	Second TDRSS Ground Terminal
STS	Space Transportation System
STTCS	S-band Tracking, Telemetry & Command System
T&DS	Tracking and Data Systems
TAGIU	Tracking And Ground Instrumentation Unit
TAGS	Text And Graphics System
TAL	Transatlantic Abort Landing
TAN	Tananarive
TAT-1	trans-Atlantic telephone cable
TBL	Tbilisi, Georgia
TCS	Thermal Control System
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TDSD	Tracking and Data Systems Directorate
TELOPS	Telemetry Online Processing System
TEI	Trans-Earth Injection
TIROS	Television Infrared Observation Satellite
TLI	Trans-Lunar Injection
TLRS	Transportable Laser Ranging System
TM	telemetry
TTS	Test and Training Satellite
TSSG	Tracking System Study Group
TT&C	Tracking, Telemetry and Command
TWT	traveling wave tube
UHF	ultrahigh frequency
ULD	Ulan-Ude, Russia
US	United States
USAF	United States Air Force
USB	Unified S-Band
USN	Universal Space Network
USNS	United States Navy Ship
USSR	Union of the Soviet Socialist Republic
VERLORT	Very Long Range Tracking
VHF	very high frequency
VLBI	Very Long Baseline Interferometry
WART	White Sands Complex Alternative Resource Terminal
WECO	Western Electric Company
WGTC	Working Group on Tracking and Computation

WRE	Weapons Research Establishment
WSGT	White Sands Ground Terminal
WSMR	White Sands Missile Range

## Glossary

**acquisition:** The process of first finding, either visually or electronically, a satellite or spacecraft of interest so it can then be tracked.

**antenna feed:** The electronic device at the focal point of an antenna through which electromagnetic wave transmissions are received, amplified, and/or transmitted.

**apogee:** The high point in a trajectory.

**array:** The electronic combining of antennas pointed at the same object so as to increase the received signal strength.

**autotrack:** Automatic tracking of a spacecraft by an antenna (or vice versa) where the position is continuously and automatically computed.

**bandwidth:** The range of frequencies occupied by a radio frequency carrier wave. The more information there is on the carrier (for example, high-definition television), the more bandwidth is required to fully transmit that data. UHF air-to-ground voice, for instance, is a low bandwidth item.

**bit errors:** The fraction of received digital bits that are errors in a transmission. The lower the bit error, the better the quality of the transmission. Bit errors, or more precisely, bit error rate, is usually expressed in exponential notation such as  $1 \times 10^{-6}$  (one bit error in a million).

**bit rate:** The rate that digital bits of data are transmitted in a digital stream. The higher the bit rate, the faster the transmission. Bit rates can vary from kilobits per seconds (thousands of bits per second) to gigabits per second (billions of bits per second).

**boresight:** The focal axis of a directional antenna.

**Capcom:** By rule, the designated voice contact between Mission Control and the astronauts. By tradition, the Capcom is always another astronaut. Others may also, on occasion, speak with the astronauts but are never referred to as “Capcom.”

**carrier frequency:** The selected frequency used to transport radio signals.

**collimation tower:** A tower, usually located a few kilometers from the main ground station antenna, equipped with a radio frequency emitter used as an aim-point to checkout and calibrate the automatic tracking capability of the antenna.

**data rate:** The rate of downlink or uplink between a spacecraft and its ground station. Usually measured in bits per second.

**demodulate:** The removal of the modulation on a carrier frequency using a series of electronic filters so as to isolate the data from its carrier.

**digital:** A transmitted radio frequency signal or scheme comprised only of ON and OFF pulses (0's and 1's).

**eccentricity:** The amount of oblateness in a spacecraft's orbit. A perfectly circular orbit has zero eccentricity while a high apogee orbit that swings around, for example, to the back side of the Moon is of high eccentricity.

**electromagnetic waves:** Electromagnetic (EM) waves or radiation is a self propagating wave in space with electric and magnetic components. Such waves carry energy and momentum. All energetic media such as heat, light and radio transmissions are part of the electromagnetic spectrum.

**elevation:** The angle above the horizon. An antenna pointed perfectly at the horizon has zero elevation. Ninety-degrees is directly overhead.

**equatorial orbit:** An orbit which has no inclination or tilt with respect to the Equator. Thus a spacecraft in true equatorial orbit will always revolve over the Equator.

**field of view:** The amount of sky that can be viewed at any one time. For an optical device, it is what can be seen at any moment with a given aperture. For an electronic device like an antenna, it is also the region where a radio frequency link can be reasonably detected.

**Figure of Merit:** Commonly referred to as G/T, or “G-over-T”, a ground station's Figure of Merit is a fundamental quantitative measure of its overall capability to enhance the received signal with respect to noise. The higher the G/T, the more sensitive the ground station is.



**g:** A measure of the equivalent gravitational acceleration experienced by an object or a person. A person standing at mean sea level experiences 1 g. Apollo astronauts returning from the Moon experienced around 8 g during reentry.

**gain:** An increase in electromagnetic signal strength due to any of several sources, resulting in the output signal being measurably stronger than the input signal. Types of gain include amplifier gain due to active electronic components such as High Power Amplifiers or Low Noise Amplifiers, and antenna gain due to antenna features such as large dish aperture and parabolic shape.

**geode:** The mathematical, gravitational model of Earth characterizing its local variations in shape, size, and mass concentrations, used by computers to calculate the orbit and trajectory of a spacecraft.

**geosynchronous orbit:** A zero-inclination, circular orbit at an altitude of 35,900 kilometers (22,300 miles) above the Equator. In such an orbit, a spacecraft's rate of revolution round Earth is the same as the rotation rate for a point on the Equator. The craft would thus appear to be hanging stationary over a given location. The term is often used synonymously with 'geostationary orbit.'

**Go/No-Go:** A decision point during a mission when Mission Control has to determine whether to proceed or abort.

**Ground Network:** A network of NASA ground stations organized under the Science Mission Directorate of Headquarters. These consist of stations in Alaska, Antarctica, Florida, Norway, and Virginia. The Ground Network (GN) also includes support from the Network Integration Center located at the Goddard Space Flight Center and the GN scheduling and VHF systems at White Sands, New Mexico.

**ground station:** A location on the ground comprising of electrical, mechanical, and/or optical subsystems used for communicating with and retrieving data from space assets.

**ground track:** The path that a spacecraft traces on the ground.

**GSTDN:** The original ground elements of the remaining Spaceflight Tracking and Data Network (STDN) as the Tracking and Data Relay Satellite System (TDRSS) was being brought operational in the 1980s.

**high inclination orbit:** An orbit whose plane is highly inclined with respect to the Equator. Such orbits have ground tracks that enable them to pass over or observe a greater amount of Earth's surface than low inclination orbits.

**high power amplifier:** An electronic device usually located at the base or the back of an antenna which greatly amplifies its transmitting signal strength for establishing command uplink with a spacecraft.

**housekeeping telemetry:** Data from a spacecraft used only for assessing the performance, health, and status of the spacecraft itself. Typical data include voltages, temperatures, propellant tank pressures, etc.

**Lagrange Points:** The Lagrangian points are five positions in the Earth-Moon-Sun interplanetary system where a small object affected only by gravity can theoretically appear stationary relative to two larger objects (such as a satellite with respect to Earth and the Moon). Such an object would appear to be in a “fixed” position (or on a relatively small “Figure 8” orbit) in space rather than in a traditional orbit in which its position changes continuously.

**launch azimuth:** The direction that a rocket is launched in, usually measured in degrees relative to due North. For example, a rocket launched due East from Cape Canaveral has a launch azimuth of 90°.

**“Lights-out” operations:** A trend in ground station operations in which a station operates autonomously in an unattended fashion or with minimal staffing. Lights-out can take many forms such as nine to five workday operations with automated service at all other times. It can also be a centralized, fully staffed operations center continuously monitoring a suite of multiple, unattended remote ground stations.

**line of sight:** The straight line between a transmitting antenna and a receiving antenna. The two can only communicate when a line of sight has been established.

**multipath:** The propagation phenomenon that results when radio signals reach the receiving antenna by two or more paths. Causes of multipath include ionospheric reflection and refraction, and reflection from mountains, buildings, ocean, and the ground. The effects of multipath include constructive and destructive interference, errors, and phase shifting of the signal. A common multipath phenomenon is ghosting of television images, for example.

**“Picket Line”:** The seven original primary Minitrack stations located approximately along the 75th West meridian, spanning North and South America. The picket line had a better than 90 percent chance of capturing every pass of a satellite in low inclination, low-Earth orbit.

**polar orbit:** An orbit whose plane is inclined  $90^\circ$  to the Equator. Thus, as its name implies, a satellite in polar orbit travels over, or near, both the North and the South pole. A great advantage of a satellite in such an orbit is its ability to observe the entire surface of the globe over time.

**max-q:** The occurrence of maximum aerodynamic pressure (q) during a rocket's ascent or a spacecraft's descent through the atmosphere. Knowing when max-q occurs is important as it factors into the structural stress experienced by the vehicle.

**parabolic:** Surface shape of an object, like an antenna reflector or the objective mirror in a telescope, based on the mathematical curve  $Y=X^2$  which focuses incoming rays to a single point.

**radio frequency:** The number of oscillation cycles per unit time that an electromagnetic wave propagates through space at. Frequency is measured in hertz (Hz).

**radio interferometry:** The use of separate antennas to receive a radio signal at slightly different times so as to determine phase differences in the radio waves. These differences can then be used to calculate position solutions for an object. Radio interferometry had the advantage of yielding highly accurate tracking angles and could be used under virtually any atmospheric condition.

**Schmidt camera:** A telescopic, astronomical camera designed to provide wide fields of view, typically used as a survey instrument in which a large amount of sky must be covered.

**solar wind:** A stream of charged particles (plasma) which are ejected from the upper atmosphere of a star. It consists mostly of high-energy electrons and protons that are able to escape the star's gravity. Many phenomena can be explained by the solar wind, including: geomagnetic storms that knock out power grids on Earth; auroras, and why the tail of a comet always points away from the Sun.

**sounding rocket:** A small, usually unguided rocket launched into the upper atmosphere for conducting experiments and scientific research.

**Space Network:** NASA's constellation of geosynchronous Tracking and Data Relay Satellites and their associated ground segment. The ground segment consists of the White Sands Complex, the Bilateral Ranging Transponder System, the Merritt Island Launch Area TDRSS Relay, and the Data Services Management Center. The Space Network (SN) is run by the Goddard Space Flight Center under management of the Space Operations Mission Directorate at Headquarters.

**state vectors:** The set of position and velocity measurements of a traveling object as a function of time, particularly those of a spacecraft in orbit or a rocket on a ballistic trajectory.

**telemetry:** Electronic data measurements downlinked or transmitted from a spacecraft to the ground.

**teletype:** A now largely obsolete electro-mechanical typewriter which was used to communicate typed messages from point to point through a simple electrical communications channel, often just a pair of wires. Later versions used a screen instead of a printer.

**tracking:** Collection of spacecraft position and velocity measurements so that its orbit or trajectory can be determined.

**wavelength:** The distance traveled by an electromagnetic wave during one cycle of oscillation. Radio frequency wavelengths ranges from millimeters to meters.

**Wing Station:** A support or backup ground station located near the designated primary station on a given mission. Deep Space Network sites were often used to support nearby Manned Space Flight Network sites in this manner.

**yagi antenna:** An antenna consisting of an array of linear elements, such as a common rooftop television antenna. The antenna achieves a distinct response bandwidth determined by the length, diameter, and spacing of all the individual elements. Its overall gain is proportional to its length, rather than simply the number of elements. Yagis can range in size from small (like TV antennas) to very large (dozens of feet long with multiple elements).

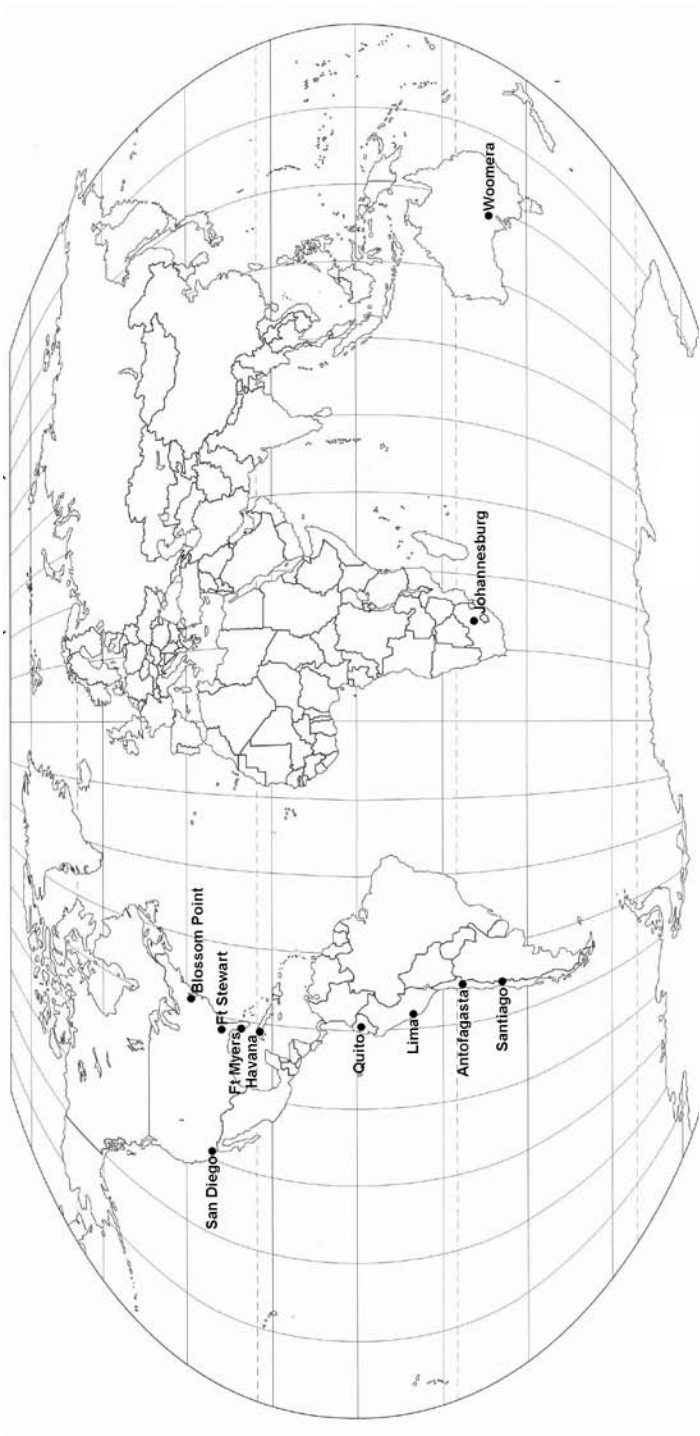
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## APPENDIX 2

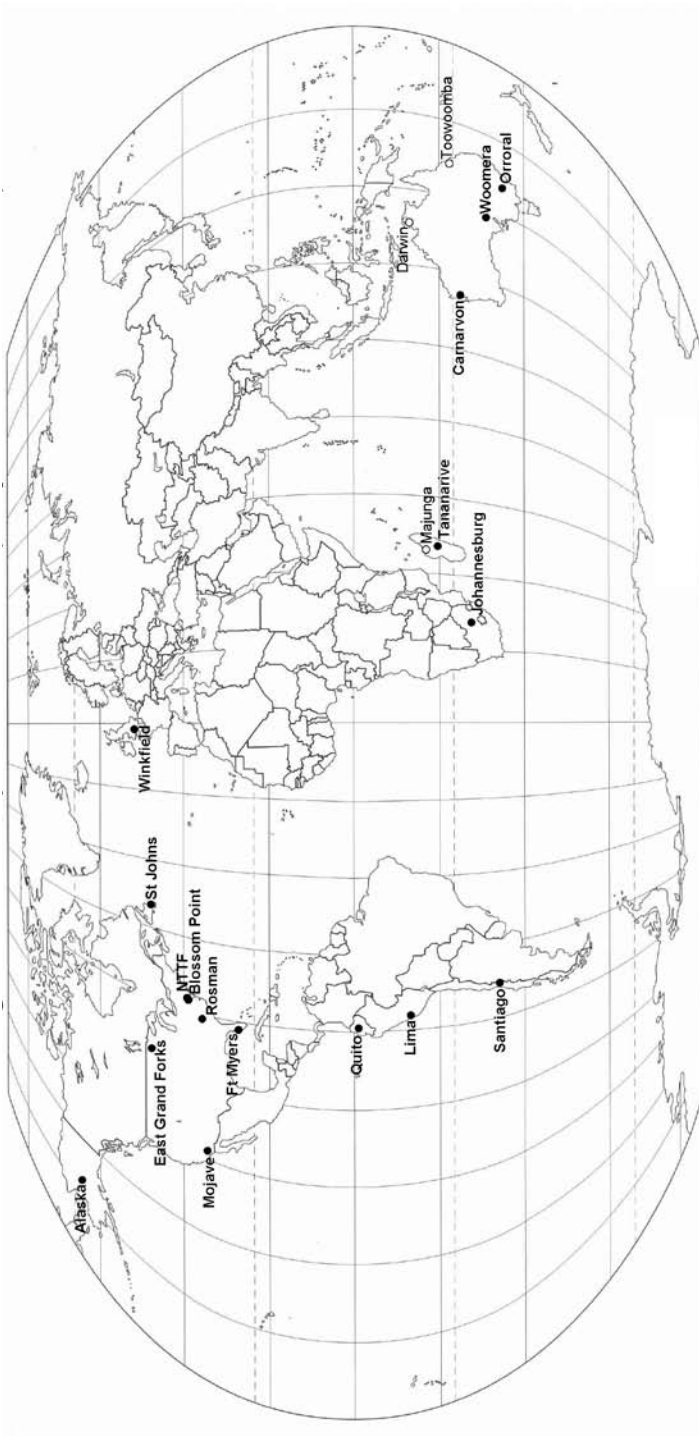
### **Maps**

Each location has been plotted by the author on blank Robinson Projections.

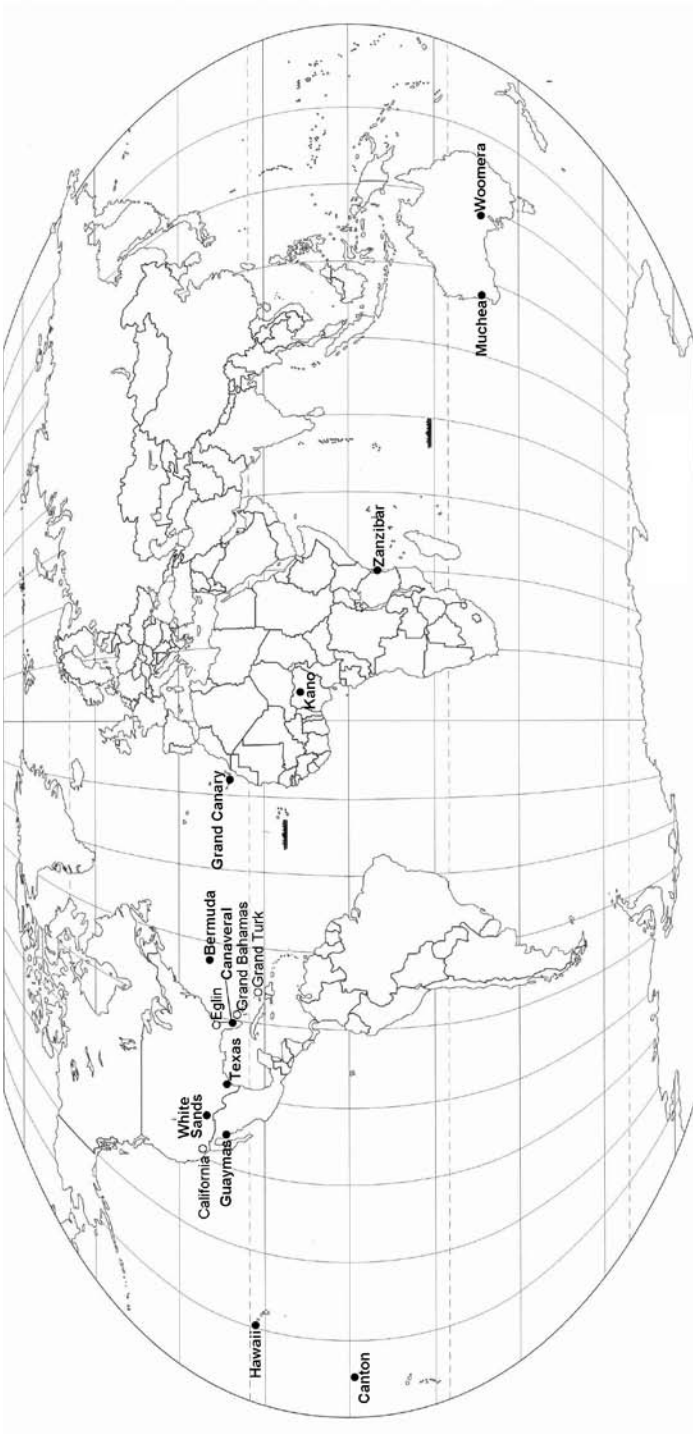
The Minitrack Network (late 1950s)



The Satellite Tracking And Data Acquisition Network (early 1960s–mid 1970s)

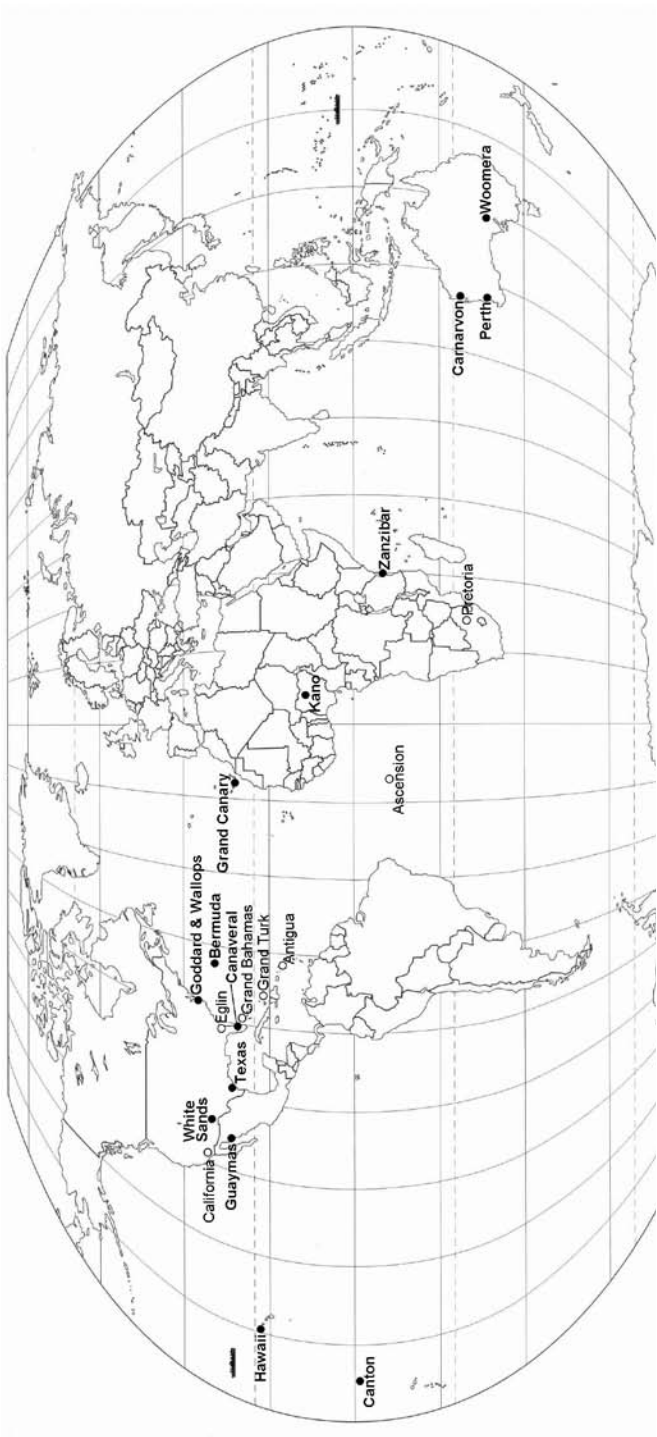


The Mercury Spaceflight Network (early 1960s)

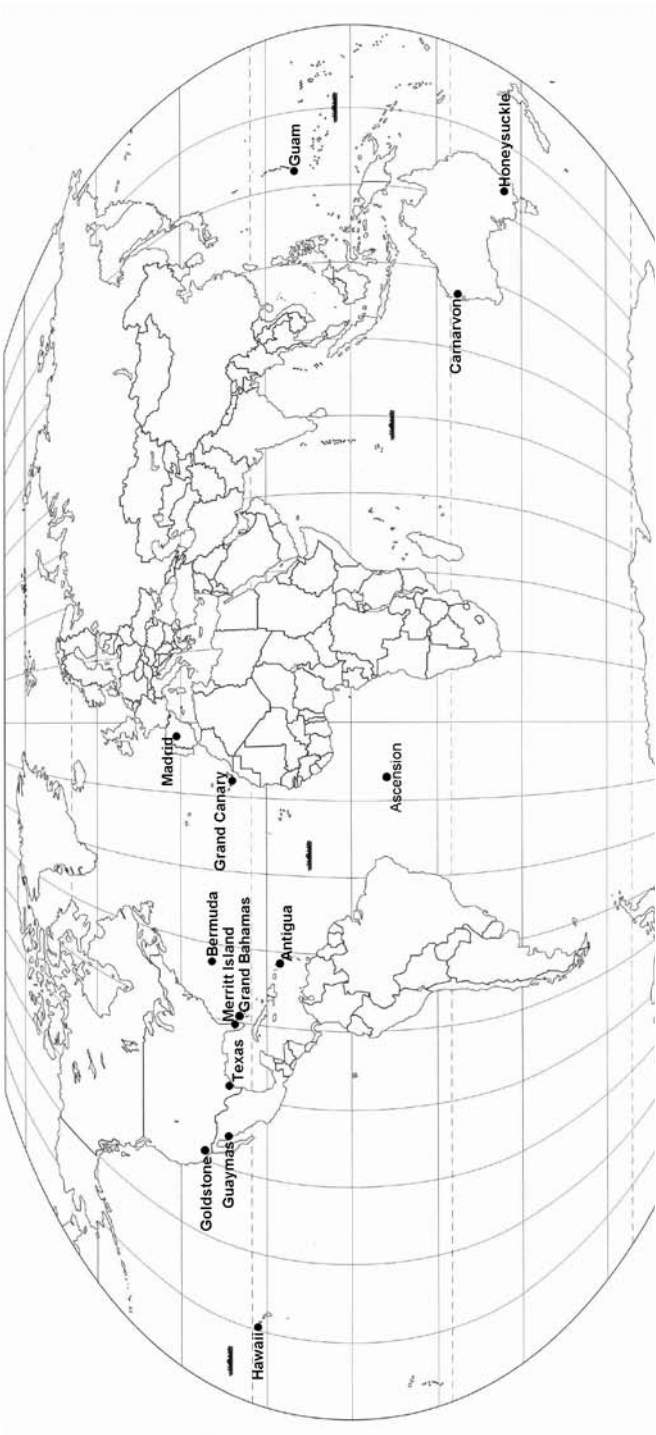




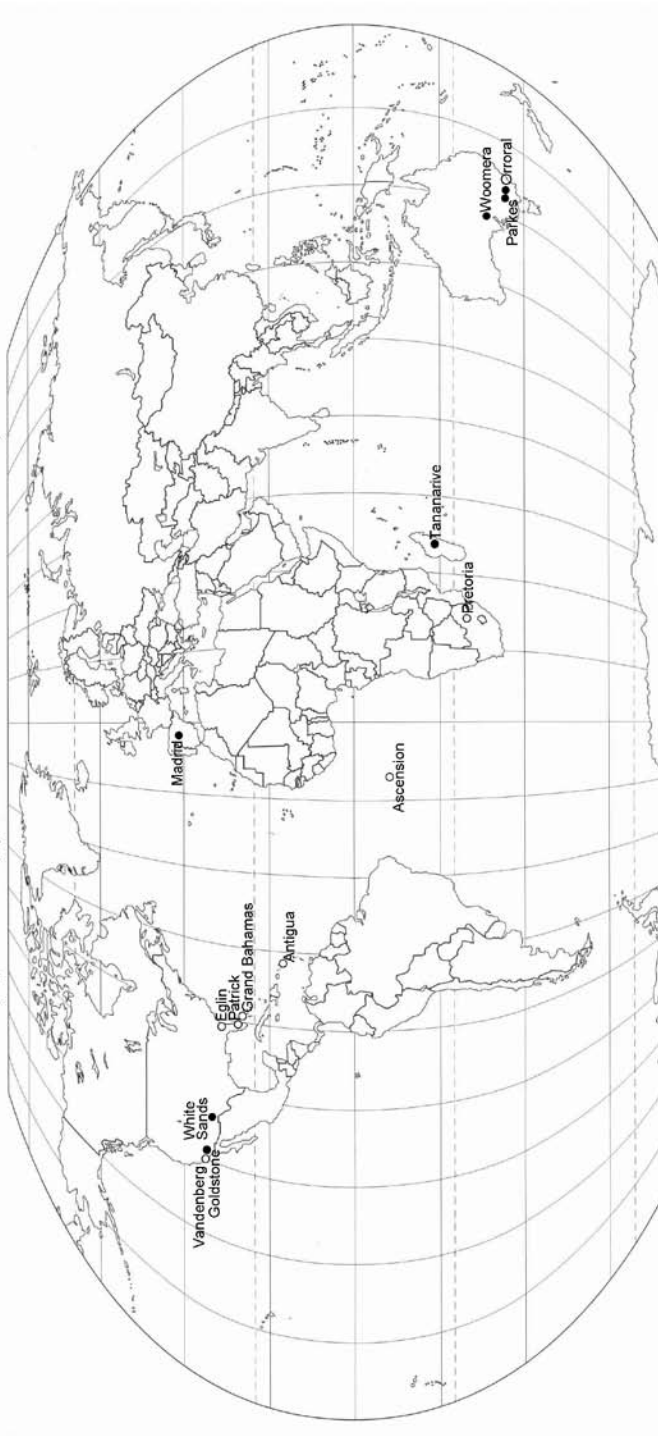
The Manned Spaceflight Network (mid 1960s)  
(Gemini)



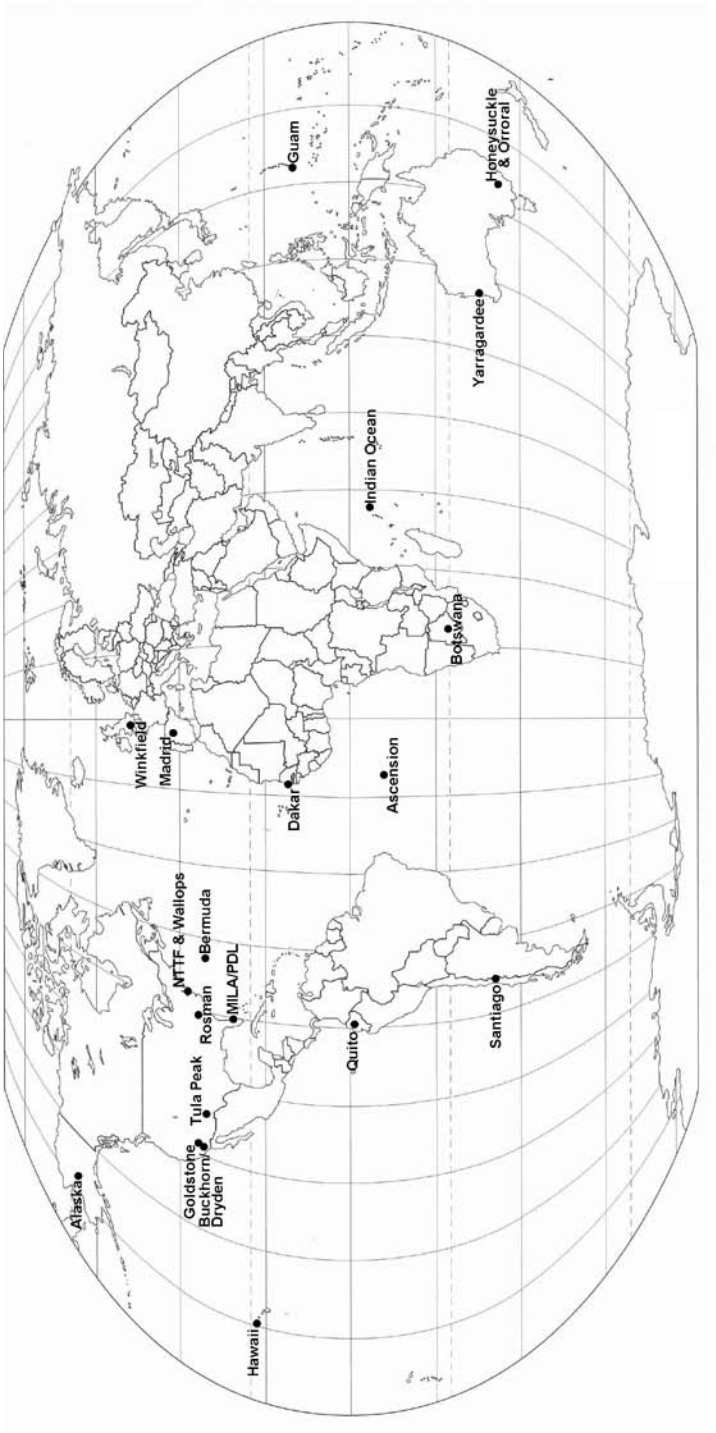
The Manned Spaceflight Network (late 1960s–early 1970s)  
(Apollo Primary Stations)



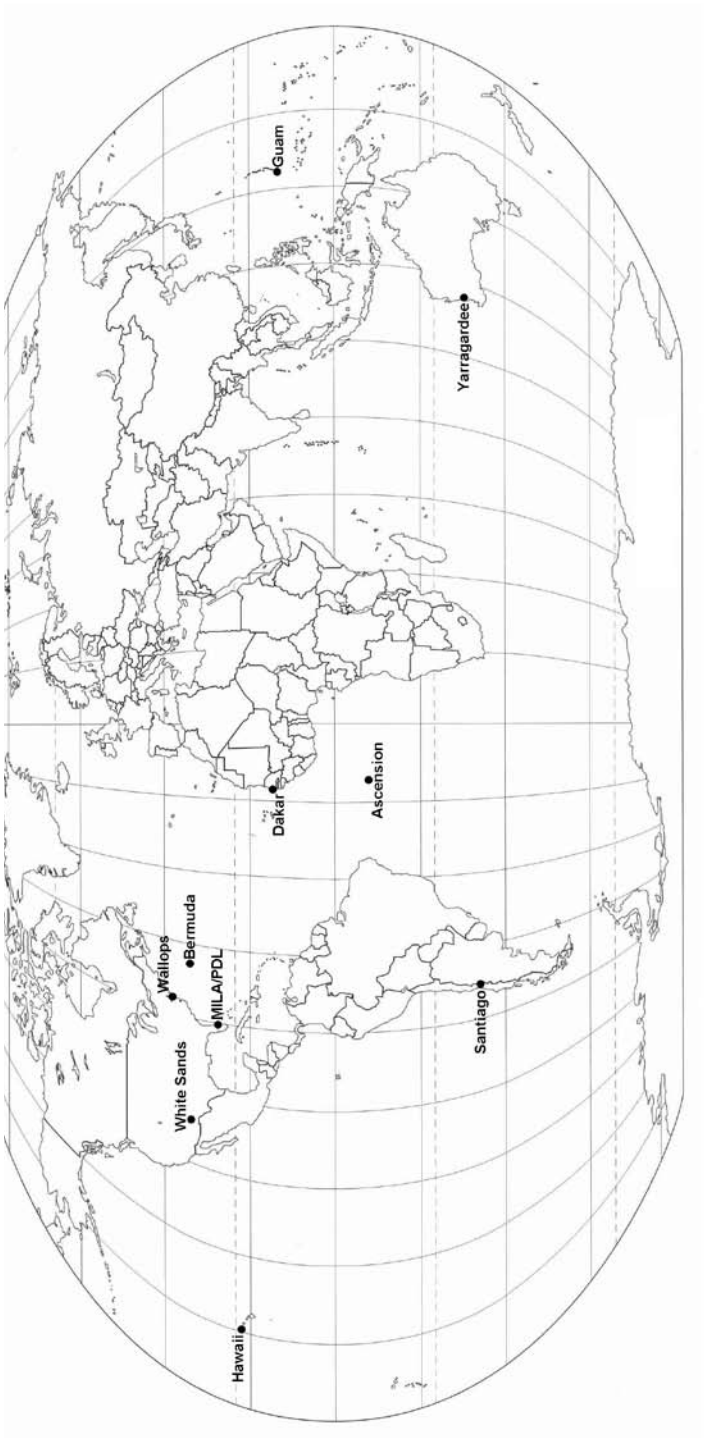
The Manned Spaceflight Network (late 1960s–early 1970s)  
(Apollo Support Stations: DOD & Others)



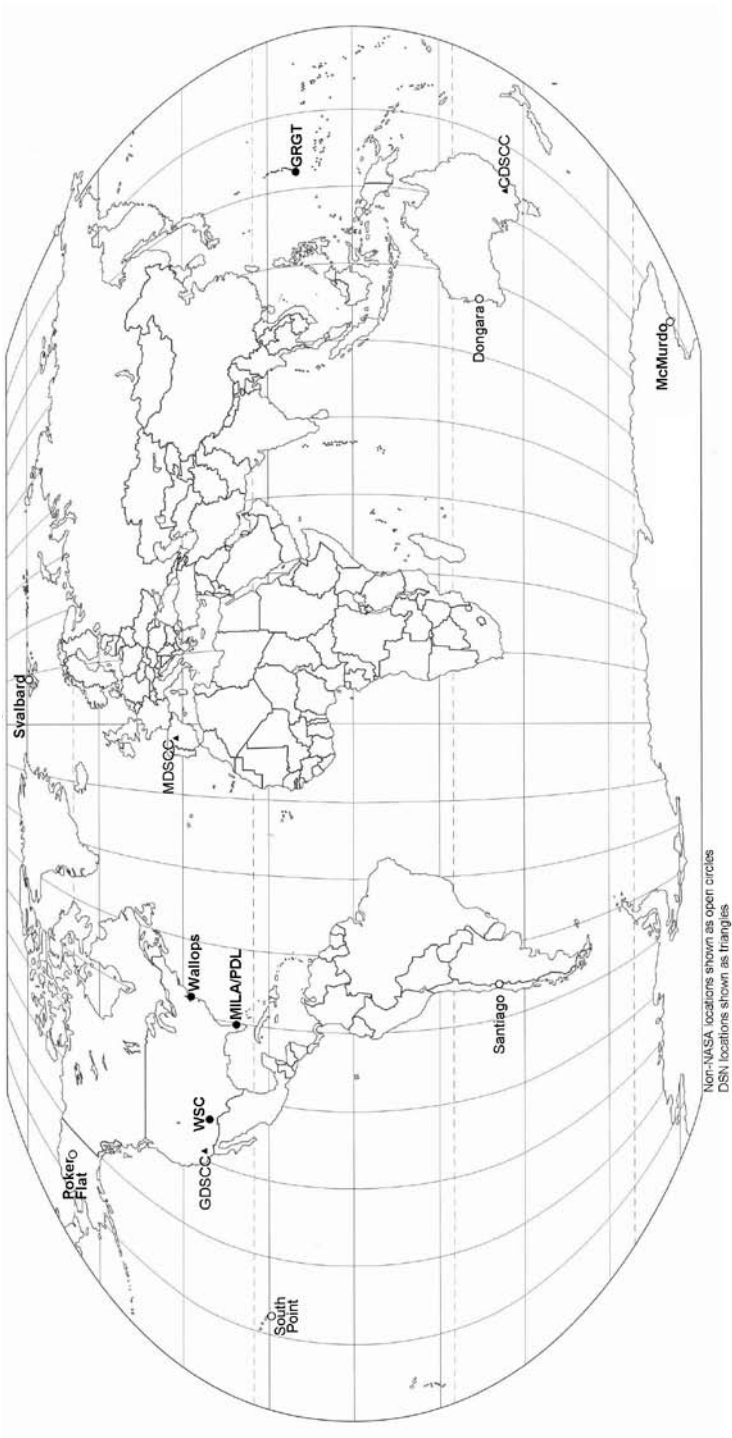
The Spaceflight Tracking and Data Network (mid 1970s–early 1980s)



The Spaceflight Tracking and Data Network (mid 1980s–early 1990s)

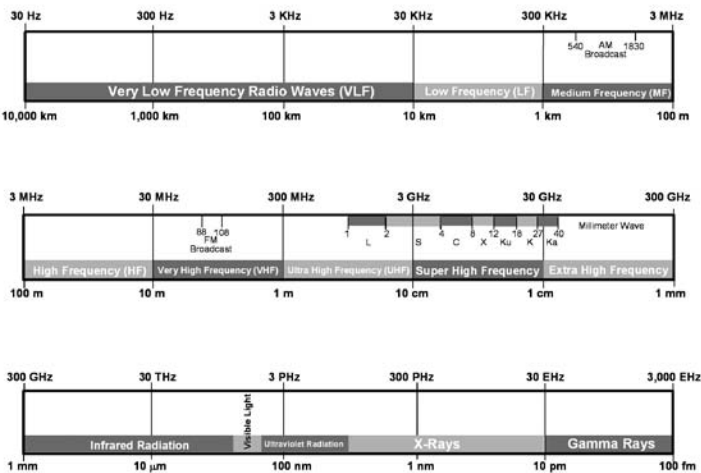


Present Day Networks



APPENDIX 3

Radio Frequency Chart



Source: Federal Communications Commission (FCC)





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## APPENDIX 4

### **Honeysuckle Station Log for Apollo 11**

The actual mission log as recorded at the Honeysuckle Creek Tracking Station (HSK) is reproduced here courtesy of John Saxon. When he donated these scans to the Honeysuckle tribute Web site (*[www.honeysucklecreek.net](http://www.honeysucklecreek.net)*) in 2003, John wrote:

It may seem strange, but Apollo support sites were not required to keep a formal log. Usually, particular times were reported to Houston as they happened or when the action was completed. Some times were reported in post-pass teletype messages.

At Honeysuckle we did try to maintain an overall log of mission events as we observed them, and the operating position on the right hand side of the main station Operations console got lumbered with the job. This position was also required to monitor anything up to six or seven voice loops simultaneously and respond as required. Also, there were two 25 key CAMs (Computer Address Matrix) used to control some aspects of the Command and Telemetry Computers (send commands to the spacecraft if data communications were lost between the site and Houston, etc.), operated by this position. So keeping a written log as well was sometimes difficult.

Most sections of the station (USB, TLM, Computer, Comms, etc.) also made note of significant times and events, and so this helped the main log keeper because they could be reported later in ‘easy time.’ Times were sometimes guessed when there was a chance to jot them down, so normally they were noted to the nearest minute unless they were deemed to be very significant!

The log pages presented here were maintained for the entire Apollo 11 mission 24 hours per day by my opposite number, Ken Lee (otherwise known as “the silver fox”) and myself as we worked alternating 12-hour shifts. It should be noted that they were “borrowed” by me at the end of the Apollo program. All the rest of the mission files, which contained many other documents on each mission, were consigned to the local landfill site (Tharwa Tip) when we were not looking.

0354  
816

DSIF LOG SHEET HSK SITE (1)

DATE 15/16 JUL 69 (GMT) LOG KEEPER SAXON

MISSION NCG 725 TERMINAL COUNT & LAUNCH

GMT	EVENT
2300	LM BER's complete & Meter rate
2310	Start $\phi 1$
231730	$\phi 1$ Complete
0114	298 & 299 low at wing during line checks
0237	CMP MAG TAPE handler suspect, running diag on CMP.
0300	" " " now green
0320	Stop aborting some wing CSM BER to run $\phi 3$
0335	Patching handler in TLM during $\phi 3$ slowing things up.
0344	Start FE 600 BER's
0350	$\phi 3$ complete & FE 600's
0351	Configured for Cadfiss
0401	TIC'd ON of TLM I/F & CAD CUE
0402	USA B/R/H H R LO CUE
0406	go on TLM Cadfiss
0409	" " " I/F LBR
0410	" " Prime B/s
0414	Cue APP Prime go on B/s
0422	Go on prime BSA
0425	Cue on wing B/s
0432	Started CMD I/F and FM/FM Go on wing B
0434	FM/FM I/F Go
0440	Go on CMD I/F & A/G
0450	Prelaunch loading
0455	" " complete INV sent
0600	Tape rolling for HBR Cadfiss/Deegan I/F
0603	Cued HBR TLM cadfiss
0604	Go on Cadfiss/degan
0718	K.S.L. ON
0746	Prime B/s in line followed by wing -
0830	Holding at T-3:30 (scheduled)
0836	Commencing confidence checks

JPL 0307 DEC 60

DSIF LOG SHEET HSK SITE (2)DATE 16 Jul (GMT) LOG KEEPER LEGMISSION NC6-725 Terminal Count.

GMT	EVENT
0036	Status to NC + confirmed by TWX
1030	Doing 2 hr confidence checks - found faulty Mux module for Sig & Verification - replaced + all checks OK.
1148	Status checks.
1149	PA-2 control encountering faulty - further investigation
	PA-2 to go manual, on beam volts 16KV then vars power by varying drive.
1202	PA-2. Beam volts set now green.
1223	Level checks OK as CSN/CS -8 + noise -48.
1230	Starting confidence checks. 1232.28
1253	Final Status to NC for launch. 1236.28
1332	L/O.
1344	101.4/103.6 Go for orbit
REV.1. 1357	H-35 start
1400	V/L checks + OK.
	CSM did not have RDS-T entered.
1418	Seams uninhibited.
1421	H/S on cam 888 to MCC.
1426	OSB in operate
AOS	143232. Pr. 143250. GFC.
	A/G very good.
LOS	143701. 143728.
1440	A/G + OSB stat + H/S data off.
1440	CSM I history sent.
1449	CSM II H/S & EOF.
1624	Successful T1 burn.
1816	Quanta GPS for 4 <sup>th</sup> time re release. - msg forthcoming 1 min
1825	Released - no P/B reqd.
1828	Release MSG rec'd.
1830	Started SRT

1250 GET  
RTN 0

OPN GETR/Now  
info HNET/NC  
it OPS.

CF0035R  
cabin floor  
1%  
5.14.1  
5

DSIF LOG SHEET Hsk SITE

DATE 16 Jul (GMT) LOG KEEPER LEE

MISSION NC6-125 TLC #1 DAY 01

10  
24 00  
23 23  
37

GMT	EVENT
1939	Ø1 4/6 Completed.
1915	ops 2 H/O JS ON
2000Z	CMD mag tape handler logic problem
2009	Running CSM cost both computers. Changing cards in CMP Mag tape logic.
2048	CMP 1540 logic green card swapping caused it
2052	AMP <sup>max</sup> problem? Acvr 7 AGC voltage rising. Amec B/p filter out took sh
2055	M25 Green - red approx 1900 & blowing fuses
2223	Pen BN Red 5 SB1 red -117
2231	Ø3 complete confused for 1/F
	<b>TLC #1</b>
2232	SEM RDS Wing 3 way on 1V!
2303	Starting FE600 checks.
2304	FE600's comp.
2306	Start CMD & F4/Fm Net 5
2315	Go on all 1/F Biomed line port 5 sec cyclic drop outs
2326	Wing 1V 0.9 pt Red after cue to G/OPS EST AOS DSMP 24.00.00
2346	M25 Cannot support again Wing released from " " 1V 0040 SC 1V support - put on CSM
2353	'DD' prime 1/5 on line
2356	Biomed on slight AOS's - Tea soon only 2-way & B/U sites remain no one queried.
2357	AOS Acvr 1 5/6 config for 10 mins of TV.
17/0001	4G A int decem lock. 30 370
0005	Autotrack -113 FM TV Mod. SH & HBR
0008	Told TIC about HBR
0017	Receiving poor quality TV.
0019	'J'P L/S Header to line
0021	FM LOS & TV
0027	RE1 lock like 4/5 on console RE1 solid lock no light
0040	Wing solid lock
0049	-121 dbm omni for PTC

JPL 0307 DEC 60

1250 GET  
RTN = 0

DSIF LOG SHEET HSK SITE

DATE 17 JUL 69 (GMT) LOG KEEPER SAXON

MISSION NCG-725 TAC #1 DAY 01

130 start  
131 int

GMT	EVENT
0052	New SCM rcd. 2 way & monitor km D/W at 110000 GET
0054	RH EKG noisy (new eating)
0123	New SOM on H/s neg TRK
0125	Recd 5 at wing no timing for 7mins now green
0132	H/O GDS → HSK A/G remote. Stat sent. very smooth H/O
0135	Valid Range. All srgs solid
0141	3 omni on cm's. 1st reject due TM dropouts 2nd HSD en OS pik due 2.8 mwp & 1/2 sec delay MCC → HSK, 3rd Div ON
0226	M/O mode 1 for RTN to 0 from N/C - Wilcoed. M/S green
0309	LOS due low signal regained with cm's mod ON RTC request.
0330THK	03002 Range Correlation Test
0358	Data had 430 Hz set on FM/FM 1/D incorrectly TIC said don't change
	240ps SPS 3secs 2640 GET for MCC #2.
0502	Wing Rdr #5 still int an 5 and also on Rdr #2
0500	Approx PK's acquired -115 HSK & -100 at PK's total PWR
0520	SB1 110.5 dB SB2 TOTAL PWR's
0525	SB1 - SB2 PK's - 101 TOTAL PWR's
	Col AGC 146 Col AGC 115 Fm " 110 Fm " 110
0550	Voice check goes comp with comm tech
0619	New SOM from H/s
0711	H/s data tracking up at CP. Tracking & historic
0720	K.S.L. on. 94.500 NM @ 180000
0749	CSM 2 H/s + EOF.
0755	Track reports Vel 10 from wing showed 10 (Ch 3.)
0803	Tic asks for check on Biomes - her 5 - passing ACSW.
0821	CSM 2 H/s + EOF - Correlation test @ 08302 to 08402
0843	" " "
0907	WB #3 Lin Com Red cannot - no sync

151  
22  
0.1 1/2  
3 in Val  
Main frame

11F 2250  
00 18 31  
35 30 GET

DSIF LOG SHEET HSK SITE 5  
DATE 17 Dec NCG-725 (GMT) LOG KEEPER LEE  
MISSION NCG-725 TUC #1 DAY 01

GMT	EVENT
0909	4/5 Hist. & EOF
0910	Re neg Rng. suspect motion number 57,000 N01 5930/ps.
0919	" " 2300g. +30 X -10 Y
0937	Scn rec'd. 6950 (amp) H0.8
0940	4/5 Hist & EOF
102030	LOS 1010Z 90.50g / 5958.
102140	LOS GFC.
1032	Omni H/O to MAD. Loranote 4/6 + Biomed.
1037	UOB Svc.
1044	4/5 Hist / EOF
1045	LOS.
1047	H/S TLM OFF by Tie.
1137	RLS MSG rec'd.
1720	Started SRT #1.
1732	#1 comp.
1916	Ops 2 4/6 SS on.
1921	Problem with ant prime X error error resolved.
2019	Possible range doppler fault 381.
2148	A/G 1/F run with MCC, Start #3.
2157	#3 complete.
2217	Set up for radfiss. Stat sent.
2222	Sent main stat. SRT stat, & manning msg.
2231	Stat FE 600's nets 4 & 6.
2233	End FE 600's all nets normal.
2250	Start CMD 1/F
2252	Start Biomed.
2257	Go on CMD & Biomed.
23010	Radfiss deleted - problems here end.
2321	N/C called re HSK & PKG recording capability TV. - set him right

JPL 0307 DEC 60

1300 acq msg  
+ as many more  
as poss to  
PK's.

DSIF LOG SHEET HSA SITE

DATE 17/18 JUL 69 (GMT) LOG KEEPER SAXON

+ 15 deg/sec

HA/ MISSION NCQ-725 TLC # 2 DAY 02

1920

GMT	EVENT
2334	Update to SCM B/site later at 351000GET AOS 003600Z GET
0015	EB1 1st AOS Prelim
0030	Still in prelimit HGA HBR no demod lock yet.
0032	S/C on omni GDS Maws -126 dbm
0037	Good Auto track & Solid HBR announced AOS & Solid HBR
0051	Tied ON
0042	'JJ' on prime L/S. Wing AOS. S/C now on HGA
0043	Biomed on Net 5
0100	D/K +12 → 0 on Gas normal test tone +0
0107	160 drift on N/B Sig cond 1, Cond replaced no data lost ran an decou 3 priors for 5 mins
012630	UDB to operate
0132	HGA H/O GAS to HSK <sup>was to be, carrier held at GDS</sup> A/G remote stat sent
0135	" panic " " " " GAS LOS 1st approx 80 secs 1 way A/G remote stat sent
0137	Requested Track for 2 more 29pts for perches.
0152	A/G excellent at -125 dbm
0156	23.307 194 R/VCO for PK's
0159	NST VSB called re wing time correlation
0246	WB #3 cannot, staggering tapes stat sent ETO 0400Z MCC #3 flips MCC #4 < 2.5 No intent at this time to move EVA up from FD debris allways possibility
0647	Gross voice check MCC Contact <sup>Calcom sys problem timer stay or crew rested</sup> we re
0652	Occasional dropouts -185 prime -128 → 129 at wing
0659	SR1 Redd 2 pen 8 <sup>Per</sup> not used to the fixed post pass
0708	New SAM prime & wing L/S - TK
0715	KSR on.
0716	WB Redd #3 <sup>Quers</sup>
0719	L/S Unit + Eor
0845	PAW NO ETO, PA3 ETO 30min P/L 10.47 ✓
0922	P/S failure



IF 2255  
 2224  
 31

DSIF LOG SHEET HSK SITE (7)  
 DATE 18 JUL (GMT) LOG KEEPER LEE  
 MISSION NSG-725 DAY 02 TLC #2

1018

GMT	EVENT
0833	Wing LOS 111721 { 12v P/L 1047 updated to TRK MAD P/L 1058Z { D/L 1036
0916	SEM acid
0917	PA 3 green PA4 ETO 1 week.
0944	EOF not written in time
1032	H/O error → MAD - no problem
1042	M/S History + EOF
1047	M/S pre. limits
1110	Inform NST/status of no-change SYD Item B.1.
111725	Wing LOS
	18:00 { E 160760/3529 M 64115/
1513	Get an updated Stat for P/A 3 from Wing at 0800 K
1700	Started SRT
1930	Ops 2 H/O J.S. ON. <u>725 DAY 03 TLC #3</u>
2051	Sys 2 denied reversed problem in VDB cost. No prob on 2nd run.
	km/sec voltage marginally lower than 2 prior runs o.k.
2140	Dump voice sig/horse sig from wing peculiar. (recorded too low)
2205	3 comp configured for cadfiss. Stats sent
2243	FK 600's complete
2254	Start CMD I/F
2257	Go on " 4 loss Sys 4
2259	Start FM I/F problem with data from ACSW to G-SFC took 2 mins.
2303	Go on FM I/F
2305	Start Cadfiss TLM
2308	" prime & wing L/S B/s wing dual to be selected
2313	Go on TLM no go on SB 2 B/s to be received
2315	Go on prime B/s received for wing
2319	Failed wing B/s again then switched sys 4 to km frag.
2326	A/G I/F complete
2331	Go on wing B/s with expected errors, go on prime APP

JPL 0307 DEC 60

0050

DSIF LOG SHEET HSK SITE

21/00322

DATE 18/19 1977 JUL (GMT) LOG KEEPER SAXON (8)

MISSION NCG-725 DAY 03 TLC #3

GMT	EVENT	Est Wing AOS = 0046Z
0005	→	" Prime AOS = 0020Z
0006	TDP prime 4/s to line 'DD'	
0015	Connected SCM red putting us	
	back up at 59.30 <del>GET</del> but moving 4/s data later disregarding.	
0020	USB 1 1st AOS's	
0032	" " 4/s TDP 'JJ' header.	
0034	TIC'd ON.	
0043	SB2 RF contact SB1 still well down.	
0046	SB1 solid lock still in manual pos.	
0048	Auto track in prelimit SB1	
0052	Demod lock TMR voice int HBR decom lock on HBR	
0102	B/V S/G FM/FM on	
0115	-112 Prime Mars -112?	
0136	5/c to OR D/P & LAR Navara Subcarrier.	
0147	Back to PM 02 Had to cmd reset. 5/c & select opposite omni.	
0200	PK's AOS.	
0300	processing PK's Tim, No-Held locks approx 0.5 better end 2 db worse than 'wing'.	
0327	USB operate.	
0332	Omni H/o GDS to HSK A/G remote stat sent.	
	<del>Prime</del>	
	<del>PR</del>	-122 247 Amq
0434	Started wing Rx 5/decom sync validity cal -129.5 +0.5	220
0448	Checking CSM <del>Wagon</del> O/P seems very quiet company	217
	will LM & B/V Vagos	212
		0450 -129
0505	Start parbes BER cal	0501 -130
	23.307158 Rx VCO for PKs	in wave P/B line
0609	LOS	had problem because ACSW
0616	AOS	Omni switch late.
0649	PK's -111 db total is average figure.	
0657	Through with parbes test going to prime.	

JPL 0307 DEC 60

Early EVA.  
105.30

2255  
2157  
58

DSIF LOG SHEET HSK SITE

9

79 48 47  
80 34

DATE 19 JUL (GMT) LOG KEEPER LCG

MISSION NC6-725 TLC #3 DAY 003.

Prime path problem m/w at Williamson. Both jitter was poor supply.

GMT	EVENT
0720	KSL on ' Mode 1. -127-8 128. (0729)
0801	TLM test completed 2290/3518 -127 (0739)
0820	Rev 5 ABC back from AMQ. -127 (0749)
0909	Momentary LOS. back to Ant. reset -127 (0800-10)
	R/L 10522 2150K 5.7 S/L Data
	MAD X 1026Z LOS 1124Z WING
1022	Scm H/O 69.13.00 (1047Z) → MAD X
1034	S S/C rejects on Ant. RST (-140).
1034	S/C called at time to MCC but not in voice of mode. informal
	MCC Combed - went to MO 6 - but H/O to mad
1102	LOS P - expected LOS WING is 1124 (153 J/L)
1126	LOS W. H/S TLM OFF
1157	Verbal release.
1200	R/S TXR Recd - during LM O/L tests.
1729	Start of 1 SRT. Decan 3 2FA1
1737	of completed
1751	LOI-1 was successful. 61.6/169.5
1920	Ops 2 H/O J/S on. PCM test & LM mode 9 RER's in progress.
1949	LM mode 9 prime figures being reported. Not much better.
2117	Start of 3 CSM & LM
2128	End of 3
2140	PK's finally manned.
2157	Started setting PK's Subcarrier cadence stat sent.
2223	Set up for cadence checking PK's thresholds. Cadence will be LM picked up.
2232	FE 600'S Nets 486 completed. compts on line.
2255	Start CMD 1/F
2255	Start Biomed 1/F.
2259	Go on CMD & Biomed.
2305	Start prime & wing H/S B/S & TLM cadence.
2313	Go on TLM
2316	Go on prime & wing H/S B/S starting prime APP
2323	Go on prime APP

JPL 0307 DEC 60

(10)

DSIF LOG SHEET 1-7 SK SITE

DATE 19/20 JUL 69 (GMT) LOG KEEPER SAXON

MISSION NCG-725 40 REVS 4, 5, 6, 7, 8, 9 & 10. Day 04

(26)

GMT	EVENT
2327	lost net 1 transmit between ACSN & HAW switch.
2332	Go on A/G
	112:25 → cancelled <del>CLM</del> . CANCELLED
	107 GET for TV i/f A/S to 4/21/0032 } in MCE TV.
	earliest possible 105:30 GET. 20/2300Z } wings rise
2357	Verbal update to SCM B/V now 83:30. Wing AOS 0048 SA
	Prim. Prelim 0107 (115)
20/0034	'JT' to line prime H/s.
0048	SB 1 AOS CSM.
0051	CSM Voice demod lock.
0053	SB 2 AOS LM.
00530	Tic'd on.
0055	LM LBR int lock & int CSM H/s lock. LM comchecks in progress
0101	SB 1 <sup>st</sup> Auto track. GDS & HAW with LM.
0109	Problem with faulty 29 pt mag ref reported until 30 mins had gone by.
011540	CSM LOS.
	<u>L/O #5</u>
0157	Keying check Net
0159	JT H/s to line prime.
020203	CSM AOS P.W. LBR then HBR
0206	FM carrier & subcarrier +250 KHz over dev.
020740	32:1 Dump on. +300 KHz " "
020930	32:1 " OFF
021020	FM carrier OFF
0217- <sup>634</sup>	LOS ) went to annl from HG A
02172	AOS ) GDS glitch on U/L ? 30 KHz Subcarriers tomorrow last before carrier
021930	LOS.
022040	AOS
0224	HGA again
0225	LM AOS AT wing ?

JPL 0307 DEC 60

SRT at 1 AM  
PKs 1/F at

DSIF LOG SHEET HSK SITE

04 0018  
33 47 18  
13 00

DATE 20 JUL 69 (GMT) LOG KEEPER SAXON

MISSION NOG-725 L/O Rows 5 6 7 8 9 & 10 Day 02

05 12 25  
04 46 25  
26

GMT	EVENT
	<u>L/O #5 [cont.]</u>
0240	PKs AOS
0244	GDS 1/4 off for HGA auto reacquisition wing LOS then AOS
0245	" " ON
0249	" " " " " " " "
0250	" " ON short loss
0253	PKs data on Beacon? (inhibited)
0318	LOS all links
	<u>L/O #6</u>
0340	GDS to operate
0345	Prime HS TX on & PA 1 ON N/G not remote GDS P/B on Nat 1
0350	N/G remote
0357	" buying check. USB 1 did not have Hk on line
0402	AOS for CMD - Late auto reacq. not too good. & P 02.07
0407	FM carriers and Subs - 98 dbm prime - 88 pkts
0905	Stout Dump #1:1
0913	" " 32:1
0915	End Dump
0416	FM off
0421	-103 SB1 -102 SB2 -88.5 db Pktz
0442	SB1-103 dbm SB2-102 dbm PKs-89 dbm Total
0502	" -103 " " -102.5 " " -88.5 " "
0512	LOS all systems 87 38 39 DSE recording start w/loss
0515	FM/FM FMT 16 CSM PM } 27:40 00 10 mins. } 40.14 D (2)
0531	P/B on line after calcs
0540	" complete

JPL 0307 DEC 60

06 28 42  
30 42

48

05 58 42  
40 42

07 10 49  
08 49  
62

DSIF LOG SHEET HSK SITE

DATE 20 JUL 69 (GMT) LOG KEEPER SAXON

MISSION NCG-725 1/0's 7 8 9 2 10

12

GMT	EVENT	
0543	Carrier ON Prime H/S Data on line	48
0548	Leading edge of main tape looks good.	32
0556	Wing H/S to line	7-40
055847	AOS all Stat sent.	88-27 10
0602	FM ON. -97	0600 21
060465	Start Dump 32:1	02 00
060534	<del>FM</del> End dump	
060612	FM OFF	
0610	Data had 1/8 irig to 400 Hz after FM remoting P/B reset	
0622	SB1 103 SB2 102 PKs -88	
0645	" 103 " 102 " -88.5	
0707	SB1 -103 SB2 -102 PKs -88	
071046	LOS All sys Stat sent	
0713	LSTTY Hist sent Bad stat sent, H/S Hist taken.	
0720	L/O 8.	
0722	KSV ON. Param list & HSP Pwr & FMTS OK.	
0753	Prime H/S to line	
0759	VOGHA in line (GWM B/U)	
075916	AOS Stat sent -103 -88.5 (PKs)	
075956	FM ON.	
080043	FM carrier (-98R) (-92 W)	
080138	Dump start. Dump stop. 080330. 32:1	
080337	FM off	
0823	P-103 W-102 PK-89.	
0838	Small cluster on PKs data (updates by DATA)	0455 28
0854	Signal levels unchanged.	0452 58
090908	LOS all systems.	38

JPL 0307 DEC 60



107.45 108 15  
1/F 2320  
21 20  
2320  
21 36  
107.45

DSIF LOG SHEET Hsk SITE 13

DATE 20 JUL (GMT) LOG KEEPER LEG 5060/076/33

MISSION NEG-725 L10's 9 & 10

GMT	EVENT
0946	L109 H/S TUM ON. Cam 888
0952	Voice / Key check over Goss!
<del>0956</del>	
100130	-102 AOS 5.5 mins late 10kHz Sweep
1004	FM ON
100602	FM Cam/ Cus.c
100900	Drum start 10-0948. Stop.
110730	L05
1116	H/S Voice #3. Net 5. P/B FMT 16 csm 92.20 → end of dm
1122	Wrong 10 Seq. in FMT 16
1127	Data on line for FM P/B. 49 RTC U/L
1135	RLS msg released.
1422	Data had wrong GET start time on P/B 92.14
	92.23 30 S/C AGE CT 0620.
	92.2
1154	P/B completed
1517	Start of SRT
102 49 11 23 11 172	1158 Noisy P/B tape + Audio Sig Gen U/L
1905	OPS 2 H/S 2.5 ON SRT in progress loading OPS programs
1932	Ran LBREMOD due Mode 08 conf turnaround with wing. Cam's patched in a scope during transmission & killed it.
201741	TOUCHDOWN !! Armstrong heart rate 110 136
2032	Doing PCM cost & ISA cost.
2049	ISA & PCM costs completed
2055	Start of 3.
2115	End of 3 csm wing TV only remaining
2216	EARLY EVA AT 0115Z APPROX.

JPL 0307 DEC 60

107:30 (129) 108:15 FM on Net 3 (14)

EVA 01152 approx. DSIF LOG SHEET HSK SITE

DATE 20/21 JUL (GMT) LOG KEEPER SAXON

014251

108 11 MISSION NCG 725 LUNAR SURFACE CSM REVS.

10748. 17 JUL 22 Day 5.

10615 Start prep

GMT	EVENT
2247	Prime Rise 108:11 Wing Moon rise 107:48. 1 Passed to track.
	106:11 AOS CSM TV Lunar surface 107:30
2259	Still progressing B&W 1/F
	EM 107:30 107:30 1/F. 108 B&W Wing
2319	Start FE600 checks. 108 HRS Hotel open.
2322	Start CSM 1/F & Biomed.
2326	Biomed is go.
2333	CMD GO
2334	A/G Go start B&W Prime 4/s & L/s & TLM Cadfiss fms 5 & 11.
2342	Start wing B&W H&L
	06:11 GET crew starting EVA prep.
	CH 35 Bit 3.
0003	Running APP prime after B/s re-run probe
0016	Checked on cadfiss wing have hit 130 ARDQ EX 3 problem
	Relay changed no further problems.
0049	
	Moon rise wing 0115.
	CSM 17 AOS wing. 0140 08
0055	107:54 H/A to wing CSM
	constant bag reminder bypass from wing. LM AOS Prime 0142 ← 15 min
	03 D/A CSM. 0147 B/U on LM
0106	LM 09 ex 10 from track.
0108	PAM's
LM 0112	Prime AOS LM Int signal. PM
0118	TIC'd on. HBR LM solid LM EKG only.
0124	Confirm LM relay to CSM after AOS from N/K EVA preps in progress.
0130	EM rechecked tie request
	CSM 17 17.
0135	LM to 09 or 10.
0137	LM TLM & TV sync.
0138	LM EKG off.
0139	EVA 1 & 2 EKG
0141	CSM AOS Q/Ling.

014108  
2308  
LS

JPL 0307 DEC 60



109.21  
110 07 35  
05 53 12  
02 38 12  
15

DATE 21 JUL (GMT) LOG KEEPER SAXON. 23255289

MISSION Lunar Surface & CSM near 17 Apr 22

993

033924  
030324  
36

GMT	EVENT
LM	CSM L/O 17 (cont)
Surface	0143 Nascam relay verified.
	0146 <sup>CSM</sup> FM dump - 96 from 0143 13 THRU. 15° Elev prime 019905.
	0150 FM off.
	0152 TV off last signals ON.
	0154 Go for Cabin depress.
	0201 CSM LOS wing.
	0202 " AOS " ) To LBR & B/U voice. watched pseudo nascom
	021127 HS LD 00222 0904 2105
	021906 Inv Sum MCC.
PLSS	0221 0.15 Deg offset in A
1.	0223 -140 CSM droppings
9 8	022330 CSM LOS wing.
80 50	-025 X -0.5 Y
12	0228 CSM AOS HGA.
	0244 -100 FM on LM.
	EVA EKG & worse on LBR.
	0251 CDR on LM porch.
	025408 TV ON.
	025625 CDR ON MOON !!! Processing HSK & GDS TV alternately.
	0306 Searches up using their TV & PAM - 90 dbm
	0325 Video recorder VR1100 red cannot ETO WK
	40 18.
	0340 AOS stat.
	034252 CSM FM ONCMD.
	034940 FM carrier.
	034524 Dump mod 32:1
	0546 2106 LM H/S & 0023
	03475 LOS & FM &
	0349 Nixon uplinking

JPL 0307 DEC 60

111.51 05 3743  
 111.24  
 27

0451 31  
 0405 31  
 4600

DSIF LOG SHEET HSK SITE 16

DATE 21 JUL (GMT) LOG KEEPER Saxon 0502 E 0

MISSION T25 EVA L/Os 18 thru 22

GMT	EVENT
	<u>L/O 18 (CONT)</u>
0354	<del>23</del> HS Lds cleaned
0355	LOS CSM wing
035630	AOS CSM go for CMD
0357	LOS CSM wing
0402 <sup>147</sup>	CSM B/V voice S/C AGC 8.7 <del>175</del> 3-75 LM FM
042530	02 uplink at wing to CSM
0426	CSM to HGA
0427	06 uplink
0427	Normal voice down
045130	CSM LOS <u>A/G</u> local
0457	EVA 2 ingress
	<u>L/O 19</u>
0510	112:10 H/O. Vice 111:51 LM GDS sent CSM AOS 0537432
0528	HS LD 0024. FM <del>175</del> problems. H/O LM 0542
0524	LOS with PAM's
	21.893750 V/L LM prog. braced for display.
	CSM 2 km to Net 1
052736	CSM AOS A/G remote. gds
0536	FD 2107 Recd TVH 118 10 3772
0539	Data had CSM decum inhibited
0542	H/O LM GDS → HSK
0544	V/L 002027 CSM
0544	1205 V/L seq.
0552	V/L Verif LM on CSM D/L NO relay or quindar SDDS investigation 053743
0602	CSM vagaa bypassed CSM D/V -50 <sup>dm</sup> on LM up bus normal level -7 <sup>dm</sup> 1743
0617	0025 H/L LD Rcd 2 2108 & 0906
0619	CSM ROS

M/C →

JPL 0307 DEC 60

(17)

DSIF LOG SHEET 1754 SITE \_\_\_\_\_

DATE 21 Jul (GMT) LOG KEEPER LEG

MISSION NC6-725 L/O 19

---

GMT	EVENT
061930	H/G & CSM AOS Go for CMD MA 02 D/L FM ON
0621	All Loads except 0025 0706 1205 & 2108 Cleared.
062148	FM Carrier & Sub-carriers - 96
062356	Dump Start 32:1
062723	stop → 5 secs of 1:1 at end of
062743	FM off
064850	CSM LOS, 0651, A/G, Remoted <span style="float: right;">109:40 VR 110</span>
0721	LD 2108 U/L OK Compare <span style="float: right;">109:45</span>
0727	Range Acq'n ASAP after HGA re-aq.
0731	U/L MD 7 LM @ 114:02:00
073613	Hos CSM Stat ant. -103.
0739	PM Sub-carrier (-96)
	Dump start 074109. Dump stop 0743:15
0742	U/L Mode 5 CSM D/L 2
074310	A/G de-remoted.
0747	LM crew jettisoning equip
075400	CSM U/L MD 6 - A/G remoted.
075750	TV LOS L/M.
0759	MD 1 PM D/L LM.
080110	CSM U/L MD 5 D/L MD 2.
080235	LM U/L MD 6. <span style="float: right;">JS 080454</span>
0804	L/S from LM, when on line - reacquire range.
0805	Sub-carrier - just seen
0807	Repeat Rang Acq every 5 mins until direction from MCC
114:33	C/O LM <sup>ENG</sup> Sub-carrier @ 114:31:00 lowers bandage to center radio CK6. <span style="float: right;">114</span> <span style="float: right;">Ans climb</span> <span style="float: right;">hard on</span>
0819	Cease 5 min range acq.
0821	Quality bit settling on Range Unit - check it.
0825	LOS 0826 + 0907 & 2109
0827	LM U/L 7: D/L 01
0828	Failure NB 2 cond. - DC restoration problem

JPL 0307 DEC 60

19 10 01  
1 25 38 00

012 54 50  
17

DSIF LOG SHEET HSK SITE 18

DATE 21 JUL (GMT) LOG KEEPER LGE

MISSION NCG-725 L/O 20.

GMT	EVENT
0830	Loads cleared. 1205, 0025, 2108, 0906.
0830	Terminate L/S from Prime on LM.
0846	Go to MD-7 L/S on DD.
090801	L/S CSM.
0908	MD to CSM. / 7 for LM. 14 mine valid Range
	<u>L/O 21</u>
0934	Remote CSM A/C at AOS
093430	AOS CSM
093453	Fm Cam/Secur. (-96)
093806	Dump Start 093944 Dump Stop
0945	SCM recd. for L/O 22.
1018	Clear LOS 0026, 0907, 2109 GCA 60
1019	H/S LA 0027, 0908, 2110
104628	CSM LOS
104835	USB Start sent 1049 CSM L/S ↑ sent.
1057	H/S hit & Eof 1059 LOS 1255Z
	<u>L/O 22</u>
113250	AOS CSM 118.30.00 Acn. (1202Z)
113532	Fm Cam/Secur. / -98.
113930	Dump Start STOP 114112.
1202	H/O to KCN (nomt HGA) - no problem. LM. A/C de-terminated
1215	Take down CSM cam at 119.25.00 (1257Z)
1220	L/S <del>LM</del> LM P/L 3 way.
124445	L/S CSM
1257	Wing cam down.
1308	RLS MSG.
1333	Start of 1 SRT
1753	APS LIFT OFF
1841	ERT of 1 complete

LM H/S H/O on Fm (MINK)

114 RTC  
3 LOS

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1/F 2350  
23 19  
46

DSIF LOG SHEET HSK SITE

(19)

DATE 21 JUL 69 (GMT) LOG KEEPER SAXON

MISSION NCG - 725 DAY 06 REV 29, 30 TEI & TE 1

GMT	EVENT
1954	b/L BER's SB1 too good suspected test tx out of spec, carrying on with wing.
2123	Trach sending acq msg's check.
2135	<b>DOCKED</b>
2156	29 pte 4/s const 7 Angles - requested again still 4/s
2217	Msgs were good forgot
2317	03 complete
2327	7/9 Net 5 5/6 7/0/0/0/2/3/4
2340	130:09 out on LM sep from N/C 1H ready? W 01 46 2 132:14 P 02 14 2 132:33
2346	FE 600's complete
2350	11/3 sig cond out out of spec Comp alignment under way
2352	Start Biomed 1/F
2353	Go on Biomed 1/F
2357	Get CMD 1/F <b>LM JETTISON</b>
0006	Go on CMD 1/F
0010	Start TLM cadfiss Prime having range lock problems
0012	Start wing BORRA 4/s
0013	" prime "
0019	Wing BORRA Go
0022 H	No netal go on prime BORRA Cue for BORRA
0031	Go on Pos A waiting for
0042	Start A/c naming Space - 15 Mark - 17
0047	Go on A/c 1/F
0119	Prime Hs data on line 'b's'



(20)

0816  
0238  
38  
081745  
9745

DSIF LOG SHEET HSK SITE

DATE 21 JUL 69 (GMT) LOG KEEPER SAXON

MISSION NCG 725 DAY 06 REV 29 30 TE1 & TE1

GMT	EVENT
	<u>LM &amp; CSM Rev 29</u>
0136	Wing CSM & LM glitches.
0139	Prime glitch on CSM.
0142	H/B struts LM TLM solid.
0145	Tic'd on still no CSM TLM.
0148	TIC 13523 41 For TE1
0151	CSM sig level rising - still no Hm or dismod lock.
0157	CSM HBR solid from wing sent to 64285.
0208	Prime 'JS' to line, after Auto track still in prelimits.
0224	SBI unable to establish A/S either scope out of cal or loss of main gain.
023143	LOS CSM
023156	LOS LM
	<u>CSM REV 30</u> Tic configured to 7 9 2303
0233	Reported to N/C. main paramp 10 dB low investing.
0248	Main line attenuator had to be decreased Klystron may be on way out. declared it green to N/C.
0302	Prime TX on 2 L/S data 'JJ'.
0308	CSM A/G remote.
0312	H/S loads 1304 & 0032 Recd.
031245	Fm Fm remote
0315	INV Sum neg MCC - on line.
0316	H/S Data JS wing MCC stat neg BAD - No SCO's.
081745	AOS Go for CMD Stat sent
031747	0033
031934	Fm ON CMD 032130 Fm Carrier & Sub
023230	Dump start 32.1
032411	" stop.
0325	Fm OFF
0326	Start 0032 v/h. O.K. <sup>comp</sup> v/h a single line DSX1 connection
0329	Start 0033 v/h O.K. comp
0330	" 1304 v/h O.K. comp

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04 22  
 34 05  
 05 06 05  
 04 29 47  
 03 52 47  
 39 00

DSIF LOG SHEET HSK SITE (21)

DATE 21 Jul 69 (GMT) LOG KEEPER SAXON

BURN AOS. 135 34 05 MISSION NCG 725 DAY 06 Rev 30 TEI 2 T/E #1  
 NO BURN LM 1/0 32 →  
135 44

05 06 68  
 04 42 11  
 27

GMT	EVENT
0339	Reading up TEI pad D/V clear but rather weak
0347	New 50's prime swing
0422	1205 H5 AD Recd.
042948	CSM LOS. <span style="float: right;">042 134:57 08</span>
0435	Comp 1 - C2 R. Real time biased 30secs to dump the remote dump biased.
	<b>T/E #1</b>
050618	AOS Stat sent. for cmd SB2 on 8/13
050753	FM ON
050937	FM carriers & subcarriers
051045	Dmp pro to line
051052	" start 32:1
051143	" " 1:1 voice high background noise
051743	" " 32:1
051832	" End
051844	FM off
052030	U/L LD 1206 in progress. O.K compare
0522	TIC'd 007 & 009 107 as BV
0635	GP RE 1 150 amp has 3 volt P.P noise spikes on it invalidating AM & calcs - calcs were done on REVR 2 and msg screwed. had 8 & 95 on it! Trying to think of new cal procedure for
0707	Requiring range
0706	LOS 0709 AOS then INT AOS Poss main peramp P
	LM 1/0 32. Wing 2 way.
071437	LM AOS -107
071954	LGC Static ABS line GC0301 GC0302 Dec
0726	LM S/S decomm
072818	LOS CSM
073038	AOS CSM
073115	LOS LM AOS 073136
073238	AOS CSM
0736	Configure wiring for CSM

071442  
 06 40 42  
 34

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DSIF LOG SHEET HSK SITE (22)

DATE 22 JUL (GMT) LOG KEEPER LEE

MISSION NCG-725 TEC #1 DAY 06

GMT	EVENT
073926	A/G O/L from wing was removed
0740	Wing Auto - 103 Mode 1 FM/CSM
	Super 3 08.08.01
0741	No further LM Support (Tux)
0742	H/O P → W. Actual 074341 A/G Voice Spd.
0744	Mode 16 O/L OMNI all the way.
0750	Mode 3. U/L CSM. Super 3
0750	CMD over cancelled - up again. CBREF
0752	Mode 6 U/L ✓ Super 3.
0757	Jump Key 1 UP over CSM/TMI
0757	Permissions to configure Warm Param.
0802	Lost CMQA after CBREF - will need. OUCH after pass.
	When A/G O/L is to be inhibited, this should be done at Command NOT Swos - lose recording otherwise
	Rx 8 at CSM FM
	Permissions to put Jump Key 1 UP.
0838	W/S Prob + EOF (-124)
085432	AOS . P. H/O Sys 3 → 4 090325Z.
0930	Configure for EXSEP FMT 1 2A 1B.
094628	✓ 129 Alsep - data over
1105	CSM. on Syst. 1/2 105:48 - 1
1152	AOS CSM (local) Exsep   X + .05
1223	LOS CSM - USB Stat. - RTC Y - .15
	unable to get USB Stat. - net 4? W. LOS 1345Z
122950	AOS CSM
130320	✓ Prelim
1307	H/O → MAD OMNI - cancelled due MAD LOS.
130408	" " " - OK.
	GET 137.58.00 - 138.18.00   w OUCH 135 W/L
1342	LOS wing
1344	Loading OUCH wing 100 HA offset. 20 dec

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2350  
2338  
12

DSIF LOG SHEET HSK SITE 23

0010 DATE 22 JUL (GMT) LOG KEEPER LGE

0128 MISSION NCG-725 TEC# 1 DAY 06

GMT	EVENT
1400	Doc# to line - Completed 1401
1413	Wine 730027Aos / 22/2350 HF P - also W ap
1501	ELS TWX Recd
1820	Start SRT #1 - Completed 1828. ✓
1919	Rcvr 1 use amp still faulty TEC# 2 Day 7.
1957	Net 4 also ACV 2TX Net 6 from NST TLM.
2209	Start apollo #3. No apollo format tape mounted
2225	end apollo #3 loading also in cmd
2323	end also #3 after 1/2 hrs fooling with PCM simulator.
2347	We should expect -132 approx from EASIEP
2352	Start FM/FM 1/2 Net 5.
2936	Data not being rec'd at Goddard.
0000	Start wing B/s RA
0006	Start dual line TLM cadfiss
0009	Some range rate data errors in wing N/s G/KMTRS checking
0010	R/Rate uses operator error
0012	Go on TLM rec'd wing B/s.
0020	155:30 TV pass from N/k report quality to MCC TV.
0026	Go on Alsoep cmd
	Crit RTC Group 1 enabled. Alsoep Alsoep 0209.
	160 CSM AOS " 0150 156:18
0104	deleted from Alsoep by Trach configuring
	prime s/c for Apollo 2 way support req'd at 160:00 GET.
	configuring prime for apollo
0136	RF contacts CSM wing.
0141	-190 increasing
0145	TIC'd on CSM solid.
0148	SB 2 Auto kach. SB 1 still configuring & calling
0216	157:45 GET ETO to end of reconfig
0235	Paramp 2 P/A's set up for apollo - going to calls

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DSIF LOG SHEET HSK SITE

DATE 23 JUL 69 (GMT) LOG KEEPER SAXON

MISSION NCG-725 TEC #2 Day 7 (cont.)

GMT	EVENT
0250	Cooled paramp oscillating configured to warm advised N/C and bent stat.
0300	AOS SB1 5 sec lead
0309	Good
0333	LOS for 30 secs low sig level.
042030	LOS for 20 secs " " "
0442	FM/FM remote TIC request
0444	LOS for 20 secs low signal.
0449	A/C buying check
0456	LOS for twice. 2nd for 2 mins.
0532	H/O BGA GXS to HSK A/C remote, stat sent. <sup>lost off at prime</sup> <sup>B/W selected</sup>
053349	H/S LD 0703 Rcd 2 V/L O.K. Ampere time update.
0542	S/C AGC two large drops 1st shortly after H/O when we lost D/L did not lose V/L according to SB2 who held lock. 2nd was poss due to <del>new</del> switching to wide on HGA.
	053259 <del>S/C</del> AGC started to decrease 053249 101
	AGC <sup>rapid</sup> drop 053259 + Gnd rcvrs. 140.5
	switched 053549 101
0718	KL ON 35 49 137
0736	Voice check 5 B Rms. 35 57
	W los 1359 87 "
1319	V pre limits 135630 2715
135701	H/O → MAD OMNI Ant. — no clutter! (149 V/L)
1401	LOS CFM H+P.
	AOS 24/0114Z 1/F PR 24/0001Z 168/38 121410/5100
	H-70 for Apollo then 24/0402Z 1/F A154 43.4
	24/1415Z Apollo
	losing AOS 24/0114Z stat.

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TIDBINBILLA

DISF LOG SHEET HSK SITE 25

182 30 00  
181 09  
86

DATE 23 Dec (GMT) LOG KEEPER LGO

MISSION NCG-725 Tec #3 DAY 08. & EASEP

180 45  
27  
17

01 55  
00 42  
73

GMT	EVENT
1920	Start SAT #1.
2137	Start #3
2146	End #3 ready for Cadfiss
2355	FE600's complete Nets 7 & 6. AOS wing 01 59 00 180 27.
0002	Start FM/FM 1/F. AOS prime 01 56 180 24.
0004	Go on FM/FM 1/F. LOS wing 16 31-16 19459:16
0008	Start CMD 1/F. LOS prime 16 31-09 19459:09
0013	End " 1/F Start BOR/RA prime & TLM. 0150 → 0220
0015	Cue on wing BOR/RA H/O 180:45
0023	Go on wing & prime BOR/RA
0024	POS A Cue.
0031	Go on POS A. Start A/G M-11-8 S-12-8 Neg 8 at MCC
0035	Go on A/G 1/F
015250	AOS CSM prime
0154	Tic'd on Ant Tm.
015706	'Jr' prime 1/F to line.
021700	H/O GDS to HSK annu A/G remote start sent.
0231	Bad echo on Net 2 since 0210 approx noisy net 1 negative at MCC after H/O
0233	New SSM prime & wing.
0238	Inhibited transmit side net 1 to check noise at MCC. Then they reconfigured nets. also lost echo on Net 2.
0345	RIC confirms H/O will be at 182:30 GET to GWM. Contact requests H/O upgrade only. Trach says will be on Apollo until 185:00.
0356	H/O Upgrade & CMD HSK → GWM. stat sent GWM came up. sweeping 20 secs early & then turned off at H/O time back on again 5 secs later we lost 20 secs of data due this.
	5 <sup>th</sup> Aug earliest for ESEP
0632	Breaking down prime CSM track to configure for Atsep. H/S Tm on Net 5 & team A Atsep on Net 4 Broomed on Net 3.
0728	Locked on Atsep 2 Running

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DSIF LOG SHEET Hsk SITE

DATE 24 Jul (GMT) LOG KEEPER LEE

MISSION NCG-725 TEL #3 DAY 08

GMT	ALSEP #2	EVENT
0742	Enable Gp 1	
0800	Bring carrier up MD-9	
0835	Go to U/L MD-3	
0922	-126.516m	
1102	VOBRA disabled	
1314	CMD. mod on ALSEP	
1316	Browed normal	
1359	Reconn 2 W8 Cone fail - lost data - back on N8 & outputting again 1400:11. (-128.)	
1411	Mod on ALSEP	
1416	Carrier OFF ALSEP - Stat sent.	
1421	ROACH on line - returns to GORO.	
1427	CMD cycline Apollo	
1437	A16 D/L inhibited CRO enabled.	
1445	Temp Key 1 DOWN	
1447	AOS CSM - 1st data on.	
1505	CSM Los AOS 1509	
1510	LOS. 151519 AOS P. 2 134 137	
1541	LD 0038 W	
	194 28.00 - 646 1020 W 163116	
	194 28.00 - 646 1020 P 1632	
1610	ALSEP PSRM sent	
1628	SEP.	
1627	Los moning	
	LOS P 163144 W 163131	
	1651 SLASH	

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